university of toronto
computing services

UTCS ComputerNews

Articles

Microcomputer News 1
New Micro Laser Printing Workshop 2
Notes on Microcomputer Hardware and Software 3
SAS Conference Highlights 5
Toronto Area SAS Society 6
High Quality Paper on the Laser Printer 6
VM/CMS Charges Online 7
Keeping Up-to-date on CMS 7
New TEMPDISK Command on CMS 8
Clarification: NetNorth Charges 9
WATFOR-77 Upgrade for VM/CMS 9
Concurrent Euclid Now Available under VM/CMS 10
Corrigendum 10

Departments

Hours of Service 10
UTCS Noncredit Short Courses 11
Change Committee 13
Recent Acquisitions in the Computer Library 13
Technical Reports Recently Received in the Computer Library 15
Documents at UTCS 16
Consulting and Enquiries 18
UTCS Directory 18
Committees on Computing 18
UTCS Terminal and Advising Sites 19
UTCS Services 20

ISSN 0315-4661 **March 1986** **No. 229**

Publisher

University of Toronto
Computing Services
Toronto, Ontario
Canada M5S 1A1

Editor: M. Parrott

Publications Assistant: E. Weitmann

Publication Date: March 1, 1986

Subscriptions

Subscriptions run for one year, beginning each January. Changes should be entered on the tear-out form at the back of this issue and mailed to *COMPUTERNEWS*, Engineering Annex, Room 207 (or phone 416-978-4034).

COMPUTERNEWS is published 8 times yearly by the University of Toronto Computing Services. Enquiries should be directed to:

The Editor
COMPUTERNEWS
11 King's College Road, Room 207
University of Toronto
Toronto, Ontario
Canada M5S 1A1

Network address: PARROTT at UTORONTO
(NetNorth/BITNET/EARN)

Permission is granted to reprint articles from *COMPUTERNEWS* for noncommercial purposes provided the author, publication and issue are acknowledged.

Permission is granted to reprint articles from *COMPUTERNEWS* for noncommercial purposes provided the author, publication and issue are acknowledged.

Microcomputer News

Macintosh Users

APPLE Canada provides free help to developers of Macintosh software for approved projects. Included are a programmer's toolkit, specifications (i.e., standards to follow), APPLE technical hotline support, and free advertising in *Wheels for the Mind*, issued quarterly by APPLE for educational distribution. This publication contains articles on the Macintosh in general, useful information on technical development, and a "Work in Progress" section covering various projects underway at universities around the world. Software developers should contact Mr. George Clarke of the U of T Computer Shop at 586-7947 for further information. *Wheels for the Mind* is available for reference at the UTCS Information Office. Articles may be submitted through NetNorth/BITNET, care of Peter Olivieri, Boston College (OLIVIERI@BCVAX3). Most of the contributing authors can also be reached via BITNET.

Public-Domain Software

A number of free software products are available on the UTCS Microcomputer Bulletin Board System (BBS), for a variety of computers. We have also recently reorganized the File and Message areas to make them easier to use. Here is a sample of the kind of software on the BBS:

In the **General** area:

WSBUG.DOC	WordStar Winstall fix for 640K PCs
QCKSTRT.DOC	How to circumvent the RAM check in IBM PCs
SASPCTIP.DOC	Tips on the use of SAS under PC-DOS
MSFORT.DOC	Known bugs in Microsoft FORTRAN Version 3.2
SASPC.TXT	Info on requirements, how to get SAS under PC-DOS
DBSPEED.DOC	Extract from article on increasing dBASE speed

In the **IBM** area:

PROCOMM	Good communications program, includes VT100 emulation, Kermit, and others
CHOP.EXE	Chops a long file into smaller files
PC-WRITE	Version 2.55 of the popular word processing package
DEWS.EXE	De-WordStar files, i.e. convert to straight ASCII text
SMALLC	The SMALL C compiler
EJUTIL.LBR	A library of useful utilities
CRYPT.LBR	A library of files to do file encryption/decryption

In the **CP/M** area:

LSWEEP	File and directory manager utility
MEM.LBR	RAM disk utility for CP/M
UNERA.COM	Unerase a (deleted) file

Other areas include:

APPLE	BASICALC	Spreadsheet program for the APPLE II
MAC	MACKERM	Kermit for Macintosh

continued...

Microcomputer News continued

INFO	(many)	Reviews of software, written by UTCS for the *Academic's Guide to Microcomputer Systems*, UTCS Guide to Micro Laser Printing, and others
MISC	(various)	Software for the Commodore Amiga and other machines is planned.

Information on how to access the BBS is available from the UTCS Information Office.

IBM PC-AT

A few users of IBM-ATs have replaced the crystal in their machines to increase the speed from 6 Mhz to 8 or 10 Mhz, at a cost of under twenty dollars. Although this violates any warranty by IBM, it improves performance significantly. Unfortunately for potential purchasers of ATs, it has been reported that IBM has changed the ROM in newer ATs so that the machine is restricted to 6 Mhz only. This apparently applies to all the ATs shipped with the 30Mb internal disk, as well as to recent models of the more usual AT with a 20Mb drive installed. No doubt some entrepreneur will provide a means of bypassing this restriction, but it is unlikely to be as inexpensive.

User Group Meetings

The following meetings are planned (no topics have been announced):

1. **IBM PC & Compatibles Users Group**: All meetings are at University College, Room 244, Tuesdays, 4:00-6:00 p.m. Dates are **February 25, March 25,** and **April 22**.

2. **CP/M Users Group**: All meetings are in Room 221, McLennan Physical Labs, 60 St. George St., Tuesdays, 4:00-5:30 p.m. Dates are **March 4, April 1,** and **May 6**.

Paul Roth

New Micro Laser Printing Workshop

Every Thursday afternoon at 2:00 p.m. UTCS presents a Micro Laser Printing workshop for all interested users. This one-hour seminar explains and demonstrates the Micro Laser Printing Service, highlighting the procedures for the word processing packages used by the attendees. In addition to demonstrating the service, this workshop allows the opportunity for users to arrange Micro Laser Printing accounts, to obtain public-domain software pertinent to their use of the service, and to actually use the service. Participants are encouraged to bring along short sample print files.

To use the Micro Laser Printing Service during the workshop, an account should be set up by the Wednesday morning prior to the workshop. Accounts are arranged by visiting the UTCS Accounting Office, McLennan Labs, Room 337.

The Micro Laser Printing workshop is held in the UTCS Microcomputer Lab, McLennan Labs, Room 257. If you are interested in using the Micro Laser Printing Service, plan to attend this weekly workshop. For further information, please contact Patricia Hood at 978-4548.

Patricia Hood

Notes on Microcomputer Hardware and Software

On Clones and Compatibles

When we wrote the *Academic's Guide to Microcomputer Systems,* about a year ago, we had examined a few of the compatibles manufactured by major companies and none of the locally produced "clones" of the IBM PC. At that time the difference in price between the IBM and the major compatibles (generally about $500) did not seem enough to justify sacrificing the obvious quality of the IBM PC and the benefits of its corporate support, while the locally made clones were simply an unknown quantity. Since then, however, prices have dropped on some compatibles and on all of the clones, and the clones have proved (as far as we know) quite reliable.

When the difference between some relatively unknown machine and the IBM was $500, it was easy to argue, as we did in the *Guide,* that the extra amount was fully justified. Now some clones can be purchased for less than half the price of the equivalent IBM machine, prompting the observation that if the clone breaks, you can buy another and still have saved money. They don't seem to be breaking, however. Furthermore, the design of the PC seems well enough known and widely enough duplicated that, in most cases, the fear of being unable to find someone to fix a broken clone is no longer justified. Some people, of course, will still prefer the comfort of knowing they have a *genuine* IBM and the convenience of having it readily fixed. (UTCS Field Services, for example, repairs IBMs but not clones.) Indeed, for someone planning to move to a location remote from a large North American city, this "convenience" may well be a necessity. Nonetheless, it is certainly not impossible to have a clone repaired.

The difference in price between a clone and an IBM PC can be applied to enhancements. At the moment, for example, you can get an XT-style machine with a 20Mb fixed disk and one floppy disk drive, 640K RAM, a monochrome graphics (Hercules-type) card with monochrome monitor, and an Epson FX-85 printer with cable for about the price of an IBM PC without most of those enhancements.

On Enhancements: the NEC V20

One inexpensive way of improving the performance of your IBM PC is to replace the 8088 central processor with an equivalent but faster chip, the NEC V20 (or mu-PD70108), for about $25. The amount of improvement seems to vary with the application, but 20-25% is not uncommon; hardware reviewer Peter Norton's performance utility rates a PC with a NEC chip as 1.7 times faster than an unmodified PC. Unfortunately, the NEC chip does not work in all the compatibles, though it does work in some; the clones are less problematic. We know that it works in the IBM PC and the Futuretron clone and does not in the Columbia; beyond that we have made no tests. For more information and some debate, see *BYTE*, February 1986, pp. 380-2.

All that is required is to pull out the old chip and put in the new one. This is a simple operation, but not without its hazards. Be sure to do the following:

1. disconnect the power cord before opening up the unit;
2. note the placement of the small indentation on one of the short sides of the 8088 so that you can install the V20 with the same orientation — otherwise damage to hardware will result;
3. make certain before you touch any of the components that you do not bear a static charge;
4. using a chip-puller, remove the 8088, gently — you may wish to use it again some day;
5. if necessary, bend the pins on the V20 into position by holding them against a flat surface and gradually moving the chip;

continued...

Microcomputer Hardware continued

6. gently fit the pins into the sockets (check the orientation of the chip!), making sure all of them are properly seated before pushing the chip home.

Your machine should then boot up without difficulty or further adjustment.

Someone with little or no technical aptitude may want to get a friend to make the change. The V20 chip and an inexpensive chip-puller should be commonly available in stores that sell parts and enhancements.

One last warning: pulling out your 8088 may void the warranty on your machine, so perhaps the best time to make this change is the day after the warranty expires.

Hardware Evaluations: the VEGA

Many people, especially those who use languages impossible to represent properly with a monochrome display, will be interested in our test of a new display board, the VEGA. Reliable sources confirm the manufacturer's claim that the VEGA emulates IBM monochrome, monochrome graphics (Hercules), Enhanced Graphics Adapter (EGA) on a monochrome monitor, and colour graphics on a colour monitor (standard or "enhanced"). Note that it does not emulate colour graphics on a monochrome monitor, unlike the Paradise or ATI Graphics Solution boards. It is expensive (CAN$750), but with 256K video-RAM on board it is considerably less expensive than the EGA alone, which does not emulate the Hercules. It is also a half-length card.

Our evaluations will probably be finished within the month; they will be published in the usual way, on the Microcomputer Bulletin Board System (BBS) and in hardcopy as a supplement to the *Academic's Guide.* The results will also be summarized in the next issue of *COMPUTERNEWS* and will be accompanied by an article explaining the complexities of display techniques on the IBM PC.

Notes on Software: Nota Bene

Negotiations continue with Dragonfly Software for special discount rates on institutional purchases of Nota Bene in bulk. Individuals who have expressed interest will be contacted when these negotiations are completed.

We also await release of Version 2.0 of Nota Bene for the several promised enhancements; these are listed in our review of Version 1.1, available from the Information Office or on the BBS. We are especially eager to see the "special language" versions, which will use the EGA or some emulation of it to represent alphabets such as Hebrew and Cyrillic. We have recently cooperated with members of the Department of Near Eastern Studies to advise Dragonfly Software on their implementation of Hebrew. We would be happy to cooperate with any other department interested in having some influence on the development of Nota Bene.

The Software Fair

The new versions of Nota Bene and several other packages of interest, especially to scholars in the humanities, will be demonstrated at a software fair to be held in conjunction with an upcoming academic conference at the University, "Computers and the Humanities: Today's Research, Tomorrow's Teaching." The conference will be held April 15-18, the Software Fair on April 16 and 17. Registration for the conference is limited; for more information contact Professor Ian Lancashire, Centre for Computing in the Humanities, New College. The Fair will be open to the public, though with some admission charge, and an extensive guidebook will be provided. For more information on the Fair, contact me at 978-8701.

Dr. Willard McCarty

SAS Conference Highlights

SAS Users Group International (SUGI) is a nonprofit organization of SAS software users. It sponsors an annual conference open to SAS users and all SAS Institute staff. This year SUGI 11 was held February 9-12 in Atlanta, Georgia; Roni Moravan and Bill Fehlner represented UTCS.

Last year's SUGI 10 focused on upcoming products, including such major announcements as SAS Version 5 and SAS for PC-DOS. At SUGI 11 the emphasis was on the reporting of and finding solutions to various problems encountered in these products. It was announced that a maintenance release of SAS Version 5 is scheduled for shipment in the second quarter of this year. This will resolve a number of outstanding Version 5 problems and provide enhancements to the display manager system.

Other areas of interest at the conference included:

1. **SAS under PC-DOS**

   Several extensions to SAS on personal computers were demonstrated at SUGI. These included SAS/STAT, SAS/IML and SAS/FSP. SAS/STAT software is now in beta test but is still [illegible] available for [illegible] distribution. SAS/IML (Interactive Matrix Language) is about to go into beta test. This package is currently available for mainframes and is expected to replace PROC MATRIX completely in a future release of SAS. A prototype version of SAS/FSP was demonstrated. It does not yet include PROC FSCALC, but other procedures are well underway.

   An exciting exhibit was a demonstration of a prototype SAS voice recognition system. This allows a user running SAS under PC-DOS to give a selected set of commands verbally instead of typing them in. This system is based on commercially available hardware but is still in the experimental stage.

2. **New Products**

   SAS/DMI serves as an application development for ISPF, IBM's Interactive System Productivity Facility running under TSO. With SAS/DMI, you can write interactive applications using the SAS language or a combination of SAS and other programming languages.

   SAS/SHARE will allow concurrent updating of SAS libraries. This will be implemented through a separate execution described as the SAS server. Users read from and write to the SAS data library through the server in order to maintain data integrity. This product is still under development.

3. **SASware Ballot**

   SAS Institute announced the results of the annual SASware ballot, which provides direction for future development. Top items for base SAS include the ability to store compiled SAS software code and to provide subsetting IF capabilities within procedures. For statistics, users want the ability to identify which observations were omitted from an analysis due to missing values and to request a one-tailed test in PROC TTEST. In SAS/GRAPH, the top items are the ability to choose default fonts and heights for all text and to interactively modify graphics displayed on a terminal screen. On CMS, users want access to shared-writable SAS data sets in discontiguous segments and the ability for REXX to issue SAS statements in much the same way that XEDIT subcommands are done. On

continued...

SAS Conference continued

MVS, users want read/write access to CMS SAS data sets on CMS format disks. For SAS on personal computers, the top items are support for MS-DOS and an implementation of SAS for the APPLE Macintosh.

The SUGI Conference also included contributed and invited papers on using currently available SAS software. Papers presented at the conference are published in the *SUGI Proceedings*. This includes the complete results of the SASware ballot. When the SUGI 11 *Proceedings* are received, they will be added to the collection of earlier *Proceedings* in the UTCS Information Office.

Roni Moravan
Bill Fehlner

Toronto Area SAS Society

The Toronto Area SAS Society is a newly created organization of local SAS users. Its purpose is to keep Canadian users involved and current with the SAS Institute. It provides a forum to exchange information, to increase knowledge about SAS products, and to solve specific problems.

The organization has two types of meetings, General meetings and Special Interest Group (SIG) meetings. A SIG is a subgroup of the membership that meets separately from the General meetings to discuss some special area of interest.

General meetings are held every other month, always on a Friday from 9:00 to 12:00 noon. The schedule for 1986 is **March 21, May 23, July 18, September 19,** and **November 21**. The location is:

Ontario Hydro Auditorium
700 University Avenue (at College)
Mezzanine Level

All are welcome to attend General meetings. Voting and SIG attendance are limited to members only. For membership information, please contact the TASS Secretary, Dorothy Garde at 866-3560.

Roni Moravan

High Quality Paper on the Laser Printer

UTCS now offers high quality Bell-Fast Bond paper for printing on the Xerox 8700 Laser Printer. Reports, listings, letters, proposals and other documents can be given a professional appearance with the use of high quality paper. Documents produced with word processing packages and standard computer listings can both be directed to this new paper by selecting the appropriate forms code for your page and type style. This includes documents formatted on microcomputers and printed on the laser printer using the Micro Laser Printing Service.

To select this paper, replace the first character of your usual forms code with either Q (for single-sided printing) or R (for double-sided).

The high quality paper costs only 1.5 cents/sheet more than the regular paper. For more information about costs, consult the UTCS Rate Schedule, available in the

continued...

Laser Printer continued

UTCS Accounting Office, McLennan Labs, Room 337. Other questions related to high quality paper should be directed to Advising Services at 978-HELP.

Terry Jones

VM/CMS Charges Online

On February 10, an enhanced version of the CHARGES command became available on VM/CMS. This command will access charges for one or more USERIDs and return the charges to the Reader of the Userid from which the request originated. The following options may be used.

CURRENT or LAST

CURRENT will give month to date usage for the current month only. LAST will give all charges for the previous month.

USERID or CAN

Customer Account (CAN) holders may request that their Userid be authorized to access charges for all Userids attached to their CAN. When authorized, the CAN holder has the option of specifying USERID to get charges for a particular Userid or all Userids under the CAN. If not authorized, s/he will, by default, be able to obtain charges for only the Userid logged on.

ALL or SUMMARY

Specifying ALL will produce complete details of the charges for the Userid(s) and month specified. SUMMARY will give total charges by resources used and total charges by Userid.

For full documentation on using the CHARGES command, type:

```
help charges
```

Because of the demand in CPU time to fill a request for charges, UTCS must impose a nominal fee of $1.00 per SUMMARY request and $3.00 per ALL request (University Rates).

CAN holders wishing to have their Userid enabled for the CAN option should send their request in writing to:

UTCS Accounting Services
McLennan Laboratories, Room 337
University of Toronto
M5S 1A1

Marg Doherty
Kheng Low

Keeping Up-to-date on CMS

Computer systems are ever-changing, and CMS at UTCS is no exception. New products are added; old, familiar products are improved; and documentation is updated. It is important to be aware of these changes.

When you log in to CMS, you see a listing of any upcoming or recent changes that could affect you. Usually a one line summary is listed for each message. To see the full message, type:

```
query logmsg
```

These messages remain available for some time and are then removed. If you have been on vacation or sabbatical, or just haven't used your CMS account for some time, you will need to update yourself.

continued...

CMS continued

UTCS provides an EXEC called OLDLOGMSG for this purpose. Simply type:

```
oldlogmsg
```

A listing of all previously posted CMS log messages will appear. Announcements are preceded by the date on which they were first posted. OLDLOGMSG lets you browse through them. You can easily scroll up and down through the listings, or use the LOCATE command to find specific keywords or phrases, such as SAS or SCRIBE.

If you use OLDLOGMSG, you will always be informed.

Roni Moravan

New TEMPDISK Command on CMS

When you first acquire a CMS account, it usually has access to only one minidisk. There are some applications, however, that may require additional disk storage on a temporary basis. For example, your input data may fit in a file on your disk, but intermediate results of a computation may take up a lot of space. In SAS, this may be because your WORK data library takes up a lot of space. In FORTRAN, data might be stored temporarily on an auxiliary file.

The TEMPDISK command can be used to create a temporary minidisk. It allows you to specify the following options: storage space, filemode, virtual address, disk label, blocksize, and device type. All or none of these options may be used, depending on your requirements. In most cases, it is unusual for the last three options to be specified.

If no option is specified, you will receive a one-cylinder temporary minidisk that will use the first available virtual address and filemode. The label, blocksize, and device type will default to standard values. See the online help for more information on these variables.

Frequently, you will want to specify storage space. For example:

```
tempdisk 10
```

This will create a ten-cylinder temporary minidisk. After the command terminates, a message will give you the filemode, storage size, and virtual address of the temporary minidisk.

Any temporary minidisk that you create remains in existence until you LOGOFF or until you DETACH it. The cost of the temporary disk space is $0.09 / cylinder / hour. For example, a ten-cylinder minidisk acquired for three hours will cost $2.70. To avoid unnecessary expense, detach the minidisk when you are finished with it. To detach a minidisk, type:

```
release <fm> (det
```

where: <fm> is the filemode of your
temporary minidisk.

That is,

```
release k (det
```

means "detach my temporary minidisk at filemode k."

If the application you are using is continually running out of temporary disk space, the TEMPDISK command is probably what you need.

For a more comprehensive description of TEMPDISK, type:

```
help tempdisk
```

continued...

CMS continued

If you are experiencing difficulties with storage space and the TEMPDISK command does not solve your problem, call Advising Services at 978-HELP.

Steve Younker

Clarification: NetNorth Charges

In the January/February issue of *COMPUTERNEWS,* the article entitled "NetNorth — Electronic Mail Demonstrations" gave a brief description of the network, and an estimate of the annual charges. UTCS would like to point out that the $200 to $300 annual cost for an account used only for sending electronic mail applies to the majority of academic and research accounts at U of T. Affiliated research institutes and organizations that are charged at more than the 100% basic rate will pay a correspondingly higher annual amount.

Paul Shindman

WATFOR-77 Upgrade for VM/CMS

UTCS has installed WATFOR-77 Version 1.3 on CMS. This is a major upgrade by the University of Waterloo; it offers two very significant and helpful features.

Exception Handling

The user can now trap the following arithmetic conditions: Fixed-point (integer) divide by zero, floating point divide by zero, and floating point exponent overflows and underflows. This is done simply by issuing;

```
CALL TRAPS (.... with the proper series
                 of arguments.)
```

Additional Bit Manipulation Functions

The following functions have been introduced: Logical AND, Logical OR, Logical Exclusive OR, Logical Complement, Shift, Rotate, Test, Return with I^{th} bit set or cleared.

If you use this version of WATFOR-77, it is highly recommended that any object files generated by the compiler should be regenerated; this is also true of the assembler files containing any of the assembly language macros described in the *WATFOR-77 User's Guide* for the IBM 370 with VM/SP CMS.

An account of compiler changes affecting users will be made available in a TECHNOTE on CMS. Please watch HOTNEWS for an announcement of this note.

If you have any questions about the new version of WATFOR-77, call Advising Services at 978-HELP.

Herb Kugel

Concurrent Euclid Now Available under VM/CMS

The Computer Systems Research Institute here at the University of Toronto has installed its VM/CMS version of the Concurrent Euclid compiler at a Class C support level. Concurrent Euclid (ConEuc) is a systems implementation language used in graduate and undergraduate computer courses in the Faculty of Arts and Science and in the Faculty of Applied Science and Engineering. ConEuc is also widely used internationally for building software for large-scale and small embedded systems, e.g., operating systems, networks, and compilers.

ConEuc offers such features as: separate compilation, concurrency, Hoare-style monitors, modules, dynamic array parameters, and systems programming features. It has a formally specified semantics, allowing mathematical verification of program correctness. Programs can be compiled on any of a number of machine configurations or cross-compiled on any of the supported machines to any other.

The VM/CMS version of the Concurrent Euclid compiler is 100% compatible with the versions running on the VAXs, SUNs, NS32016s, and personal computers (running MS-DOS) around campus. A textbook (*Concurrent Euclid, the UNIX Systems, and TUNIS* by R.C. Holt) and the PC version of ConEuc are available from the University of Toronto Bookstore. Further information on implementations of the Concurrent Euclid compiler for other machines is available from the Computer Systems Research Institute at 978-6985.

Steve Perelgut

Corrigendum

In the January/February issue of *COMPUTERNEWS,* an error occurred in the article "Pseudotypesetting Font Improvements." Instructions for printing a pseudotypesetting document on CMS should have included the command GETME SCRIBE, which must be issued before the 87SET command.

Hours of Service

Good Friday and Easter Sunday			
	March 28 (Good Friday)	**March 29 (Saturday)**	**March 30 (Easter Sunday)**
IBM MVS GPJS(Classes B and E, Calcomp)	closed	10:00-18:00	10:00-18:00
IBM MVS GPJS(Class A, WYLBUR, APL, TSO)	unattended	10:00-18:00*	10:00-18:00*
IBM VM/CMS	unattended	10:00-18:00*	10:00-18:00*
GP UNIX	unattended	unattended	unattended
Normal hours of service for all systems will resume Monday, March 31, 1986.			

* *Running unattended outside these hours.*

UTCS Noncredit Short Courses

A number of noncredit courses are offered on the various products and services supported by UTCS and available on mainframe computers. There is a growing need for these courses as people find themselves becoming more involved with computers and information processing systems. The courses offered are geared toward text processing, for those who want to enter a thesis or manuscript online, and toward statistical applications, for people wanting to do data analysis and produce reports.

UTCS has designed the following courses to help you get started. If you would like further information, or if you want to register for any of these courses, please contact:

Education Coordinator
978-4565

At press time the only course scheduled was:

SAS101 - Introduction to SAS
Date: March 31 - April 4, 1986
Time: 9:30 - 11:30 a.m.

FORT/CMS101 - Introduction to CMS for FORTRAN Users

Introductory — Hands-on course

Topics: Editing and managing files; communicating electronically with local and international users; writing command scripts (EXECs); compiling, executing, and debugging FORTRAN programs in the CMS environment.

JCL101 - IBM Job Control Language for Beginners

Introductory

Topics: Use of the JOB statement to signal the beginning of a job and the end of a previous job; use of the EXEC statement to identify each jobstep and tell the operating system what program or procedure to EXECute; and the identification of a dataset needed for the jobstep by using the DD (Data Definition) statement.

SAS101 - Introduction to SAS

Introductory — Hands-on course

Topics: What is a statistical package?; What is SAS?; syntax and definitions; the DATA step; some basic PROCs (PRINT, FREQ, PLOT); data set manipulation; creating and managing data libraries.

SAS201 - Intermediate SAS

SESSION 1 - Input Formats and Report Writing

Topics: SAS formats; pointer controls and format modifiers; PUT and FILE statements; and LAST and FIRST by-variables. Some examples of how these statements can be used together to produce customized reports will be provided.

SESSION 2 - SAS Regression Procedures

Topics: SAS uses several procedures for regression analysis. Similarities and special features of these procedures will be discussed giving the student a better understanding of how to decide which procedure to use.

SESSION 3 - SAS Multivariate Procedure

Topics: Procedures for analysis of variance, multivariate analysis, discriminant analysis, and clustering. Overview of these procedures and their uses will be presented.

SESSION 4 - SAS Macro Language

Topics: SAS Macro Language, which has been greatly expanded in SAS82. New macro features will be discussed and potential uses and abuses will be examined.

continued...

Short Courses continued

SESSION 5 - PROC TABULATE and PROC CALENDAR

Topics: TABULATE, which constructs tables of descriptive statistics from compositions of classification and analysis variables, and CALENDAR, which displays data from a SAS data set in a month-by-month calendar format. Examples of these two new procedures will illustrate flexibility and usefulness.

SAS/CMS101 - Introduction to SAS and CMS

Introductory — Hands-on course

Topics: Basic concepts required to work with the CMS system; management of data files using FILELIST on CMS; editing of files using XEDIT; preparation, submission and retrieval of jobs; descriptive statistics; definition of terms (i.e., variables, observations, and missing values); data cleaning.

SAS/GRA101 - Introductory SAS/GRAPH

Introductory

Topics: Special statements required and their options; a description of some of the SAS/GRAPH PROCs that are available; hardware devices and their options.

TXT/CMS101 - XEDIT and SCRIBE on CMS

Introductory — Hands-on course

Topics: Use of the editor, XEDIT; formatting using SCRIBE; environments applicable to a wide variety of documents.

TXT/UNIX101 - ed and SCRIBE on GP UNIX

Introductory — Hands-on course

Topics: Use of the editor, *ed*; formatting using SCRIBE; and manipulation of files and directories.

TXT/SCR102 - SCRIBE Formatter

Introductory — Hands-on course

Topics: Use of predefined document formats (e.g., letter, article, thesis); formatting commands; and analysis of specific user documents.

TXT/SCR202 - Special SCRIBE Topics

Introductory — Hands-on course

Topics: Bibliographies, hyphenation, Mathematical Output Facility, and thesis preparation.

TXT/UNIX103 - nroff/troff on GP UNIX

Introductory — Hands-on course

Topics: Use of the editor, *ed*; formatting using *nroff/troff*; and manipulation of files and directories.

TXT/UNIX203 - tbl Program on GP UNIX

Introductory — Hands-on course

Topics: Column layouts; options; formatting commands; and printing on a variety of output devices, including the Varian and CAT/8 phototypesetter.

Irene Rosiecki

Change Committee

Changes to the IBM Academic MVS Machine Services

1. VS FORTRAN 1.4.1 was installed as NEW on the MVS system on January 18.
2. PL/I Release 5.0 was installed as "NEW" on the MVS system on January 13.
3. DOWNLOAD for CDF/PC was implemented on January 20.

Changes to IBM VM Machine Services

1. DSD 5.08 was installed on CMS for User Test on December 5, 1985.
2. The command OLDLOGMSG was added to CMS on December 20, 1985 to give access to notices that have been removed from QUERY LOGMSG.
3. CMS DCF Release 2 was disabled January 9 because the product was unsupported.
4. WATBOL was removed from CMS on January 2.
5. VS FORTRAN 1.4.1 was installed as "NEW" under CMS on January 18 as part of a normal upgrade.
6. Improved large and italic fonts for SCRIBE's PressRoman Font Family were added on January 17.
7. PVM was installed on January 20.
8. WSCRIPT 85.1 became the current version on January 17.
9. TEMPDISK Exec was added to CMS on January 27.

Changes to Other Systems and Services

1. LISREL was installed on EPAS December 10, 1985.
2. SAS 5.08 was installed on EPAS CMS December 20, 1985.
3. PVM was installed on EPAS January 20.
4. NTS10 was upgraded to the latest release on the GP UNIX machine on January 30.
5. The three U VAXs were renamed UTSID, UTROB, and UTMIKE on January 20.

Beverly Scarborough

Recent Acquisitions in the Computer Library

Aho, Alfred V.
Compilers: principles, techniques and tools, by A.V. Aho, R.Sethi and J.D. Ullman.
Reading, Mass., Addison-Wesley, 1986.

Allan, Boris.
Introducing LOGO.
London, Granada Pub. Ltd., 1984.

American Association for Artificial Intelligence.
Proceedings of the first national conference,
Stanford, 1980.

Boyle, Thomas A.
FORTRAN 77, PDQ.
Monterey, Cal., Brooks/Cole, 1985.

Brachman, Ronald, J., ed.
Readings in knowledge representation, ed. by R.J. Brachman and H.J. Levesque.
Los Altos, Cal., Morgan Kaufmann, 1985.

Brookes, Cyril Henry Putnam.
Information systems design, by C.H.P. Brookes, et al.
Sydney, Prentice-Hall, 1982.

Cohen, Paul R.
Heuristic reasoning about uncertainty: an artificial intelligence approach.
Boston, Pitman, 1985.

continued...

Computer Library continued

Date, C.J.
An introduction to database systems, v.1.
4th ed.
Reading Mass., Addison-Wesley, 1986.

Demongeot, Jacques, ed.
Dynamical systems and cellular automata,
ed. by J. Demongeot, et al.
London, Academic Press, 1985.

Edwards, Perry.
Systems analysis, design and development
with structured concepts.
New York, Holt, Rinehart and Winston, 1985.

Fallside, Frank, ed.
Computer speech processing,
ed. by F. Fallside and W.A. Woods.
Englewood Cliffs, N.J., Prentice-Hall
International, 1985.

Flora, Philip C., ed.
International robotics industry directory.
4th ed.
Conroe, Texas, Technical DataBase Corp., 1984.

Graphics Interface '82, Toronto, May 1982.
Proceedings.
Ottawa, N.R.C., 1982.

Horowitz, Ellis, ed.
Programming Languages: a grand tour. 2d ed.
Rockville, Md., Computer Science Press, 1985.

International Conference on Very Large
Data Bases.
Proceedings of the 9th (1983) and 10th (1984)
Conferences.

Korf, Richard E.
Learning to solve problems by searching for
macro-operators.
Boston, Pitman, 1985.

Mellish, Christopher S.
Computer interpretation of natural language
descriptions.
Chichester, Eng., Ellis Horwood, 1985.

Merrett, Timothy Howard.
Relational information systems.
Reston, Va., Reston Pub. Co., 1984.

Ohta, Yuichi.
Knowledge-based interpretation of outdoor
natural color scenes.
Boston, Pitman, 1985.

Palay, Andrew, J.
Searching with probabilities.
Boston, Pitman, 1985.

Reichman, Rachel.
Getting computers to talk like you and me:
discourse context, focus and semantics (an
ATN model).
Cambridge, Mass., MIT Press, 1985.

Rosenberg, Jerry Martin.
Dictionary of computers, data processing and
telecommunications.
New York, Wiley, 1984.

Stonebraker, Michael, ed.
The INGRES papers: anatomy of a relational
database system.
Reading, Mass., Addison-Wesley, 1986.

Tremblay, Jean-Paul.
The theory and practice of compiler writing,
by J-P. Tremblay and P.G. Sorenson.
New York, McGraw-Hill, 1985.

Tsichritzis, Dionysios C., ed.
Office automation: concepts and tools.
Berlin, Springer-Verlag, 1985.

Underkoffler, Milton M.
Introduction to structured programming with
Pascal.
Boston, PWS Publishers, 1983.

Stephanie Johnston

Technical Reports Recently Received in the Computer Library

University of Newcastle Upon Tyne

Koutny, Maciej.	Train journeys in the Merlin-Randell problem. 28 p. #205.
Lee, T.A. and Linton, A.	UDSTP: a transport protocol for a uniform datagram service. 11 p. #208.
Mancini, Luigi.	Modular redundancy in a message passing system. 20 p. #209.

SRI International

Konolige, Kurt.	A deduction model of belief and its logics. 295 p. TN-326.
Nilsson, Nils J., ed.	Shakey the robot. 139 p. TN-323.
Perrault, C. Raymond.	On the mathematical properties of linguistic theories. 27 p. TN-345.
Shieber, Stuart.	Criteria for designing computer facilities for linguistic analysis. 26 p. TN-354.

Stanford University

Hobby, John Douglas.	Digitized brush trajectories. 117 p. #85-1070.
Hochschild, Peter H.	Resource-efficient parallel algorithms. 90 p. #85-1073.
McCarthy, John.	Applications of circumscription to formalizing common sense knowledge. 29 p. #85-1077.
Southall, Richard.	Designing new typefaces with Metafont. 33 p. #85-1074.

University of Southern California

DeSchon, Annette L.	INTERMAIL, an experimental mail forwarding system. 14 p. ISI/RR-85-158.
Moses, Lisa.	A basic guide to UNIX. 68 p. ISI/TM-85-157.

Stephanie Johnston

Documents at UTCS

All vendor-produced documentation may be ordered through the UTCS Information Office, Room 206, Engineering Annex. UTCS documents and selected vendor documents are also stocked there for purchase. Whenever feasible, documents are made available online, and users are encouraged to print their own copies. On the MVS and VM machines, special commands have been provided for this purpose.

To print online documents on:

IBM MVS
WYLBUR users type "do document?"
TSO users type "help document"
APL users type ")LOAD 1 UTCSGUIDE<CR>HELP"

IBM VM/CMS
type "help document"

GP UNIX
use *ipr* command

See examples at the end of next page.

UTCS Documents in hardcopy

New:

Previously announced:
Academic's Guide to Microcomputer Systems
Character Sets for Highspeed Printing
UTCS GUIDE TO PRODUCTS AND SERVICES: Introduction
UTCS GUIDE TO PRODUCTS AND SERVICES: Basics
UTCS GUIDE TO PRODUCTS AND SERVICES: Accounting
UTCS Catalogue: Access, Part 1
UTCS Catalogue: Access, Part 2
UTCS Catalogue: IBM MVS Utilities
UTCS Catalogue: Numerical Products
UTCS Catalogue: Statistics Products
UTCS Catalogue: Storage
UTCS Catalogue: Text Products
UTCS Guide to Census Tapes
UTCS Guide to File Transfer Service
UTCS Guide to KERMIT
UTCS Guide to Mainframe File Transfer Facility
UTCS Guide to Text Processing on GP UNIX

UTCS Documents online	MVS MANUAL	CMS LISTING	GP UNIX	Forms Code
New:				
Previously announced:				
UTCS GUIDE TO PRODUCTS AND SERVICES:				
Basics	BASICS	BASICS	/usr/doc/utcs/basics	*
UTCS Catalogue: Access, Part 1	ACCESS1		/usr/doc/utcs/access1	*
UTCS Catalogue: Access, Part 2	ACCESS2		/usr/doc/utcs/access2	*
UTCS Catalogue: IBM MVS Utilities	MVSUTIL	MVSUTIL		*
Product-Function List	UTILLIST	UTILLIST		BXQD
UTCS Catalogue: Numerical Products	NUMCAT	NUMCAT		*
Product-Function List	NUMLIST	NUMLIST		BXQD
UTCS Catalogue: Statistics Products	STATCAT	STATCAT		*
Product-Function List	STATLIST	STATLIST		BXQD
UTCS Catalogue: Text Products	TEXTCAT	TEXTCAT	/usr/doc/utcs/textcat	*
UTCS Guide to APL	APLGD			*
UTCS Guide to APLXFR	APLXFR			*
UTCS Guide to BMDP	BMDP	BMDP		*
UTCS Guide to Census Tapes	CENSUS	CENSUS	/usr/doc/utcs/census	*
UTCS Guide to File Transfer Service	FTS			*
UTCS Guide to GP UNIX			/usr/doc/utcs/gpunix	*
UTCS Guide to GPJS	GPJSX	GPJSX	/usr/doc/utcs/gpjs	*
UTCS Guide to Highspeed Printing	PRINT	PRINT	/usr/doc/utcs/print	*
UTCS Guide to IBM MVS Online Storage	IBMDISK	IBMDISK		*
UTCS Guide to KERMIT	KERMIT	KERMIT	/usr/doc/utcs/kermit	*
UTCS Guide to Mainframe File Transfer Facility	MFTF			*
UTCS Guide to Micro Laser Printing	MICRLASR	MICRLASR		*
UTCS Guide to SAS	SAS	SAS		*
UTCS Guide to SCRIBE		SCRIBE	/usr/doc/utcs/scribeguide	*
(For printing instructions, see page 1 of document)				
**Recommended forms code for the 8700 is YXLE unless otherwise stated.*				

UTCS Documents online	MVS MANUAL	CMS LISTING	GP UNIX	Forms Code
UTCS Guide to Series/1 Terminal Use	SERIES	SERIES		*
3270 Emulation:				
UTCS Guide to Cybernex APL100 and Volker Craig VC404	CYBER	CYBER		*
DM1520	DM1520	DM1520		*
Hardcopy Terminal	HARDCOPY	HARDCOPY		*
IBM 3101	IBM3101	IBM3101		*
IBM PC KERMIT	PCKERMIT	PCKERMIT		*
SOROC IQ	SOROC	SOROC		*
VT52	VT52	VT52		*
VT100	VT100	VT100		*
UTCS Guide to SPSS	SPSS	SPSS		*
UTCS Guide to SUBUTILS	SUBUTILS	SUBUTILS		*
UTCS Guide to Text Processing on GP UNIX			/usr/doc/utcs/text	*
UTCS Guide to TFW.MAK in SCRIBE		TFWMAK	/usr/doc/utcs/tfwguide	*
UTCS Guide to TSO	TSOGD			*
UTCS Guide to UTDSUTIL	UTDSUTIL	UTDSUTIL		*
UTCS Guide to VM/CMS	CMSGD	CMSGD		*
UTCS Guide to WYLBUR	WYLINTRO			*
UTCS WYLBUR Tutorial	WYLTUTOR			*
Other Documentation online:				
KERMIT Protocol Manual	KERMITPM	KERMITPM		YXOE
KERMIT User Guide	KERMITUG	KERMITUG		YXOF
Waterloo SCRIPT				
Reference Manual	WSCRPTRF	WSCRPTRF		YXLC
User's Guide	WSCRPTUG	WSCRPTUG		YXLC
GML USER'S Guide	GMLUG	GMLUG		YXLC

In these examples, the document to be printed is the UTCS Guide to Census Tapes (MANUAL/LISTING=CENSUS). <CR> means carriage return.

TSO: document census forms(yxle) <CR>

WYLBUR: do document <CR> and respond to the prompts.

CMS: document <CR> <CR>
laser census listing (forms yxle <CR>

GP UNIX: nohup ipr -8p -fyxle /usr/doc/utcs/census & <CR>

* *Recommended forms code for the 8700 is YXLE unless otherwise stated.*

Consulting and Enquiries

Central Advising Office (Appointments)	HELP	300 Baud Interactive Services	6200
Central Advising Office (Phone-in)	HELP	1200 Baud Interactive Services	3959
Microcomputer Support Group(MSG)	8701	Datapac	4320, 0056
Numerical/Statistical Advising(SNAC)	STAT	Telenet	0302043200056
System Status Enquiries (GP UNIX)	4318	Tymnet	<backspace> DPAC;302043200056
System Status Enquiries (IBM)	7393		

Applications Support & Advising Supervisor	Alex Nishri	MP257	7109
External Marketing Consultant	Ihor Prociuk	MP350	6875
Erindale College	Joe Lim	ER2035	828-5311
Scarborough College	William Barek	SC626	284-3173
General Enquiries	Dale Wright	EA206	4990
Account & Access Code Enquiries (U of T)	Agatha Stevens	MP337	8703
Account & Access Code Enquiries (External)	Sylvia May	MP337	7148
Tape Library (Academic Services)	Rosa Ciddio	MP368	7319
Tape Library (Administrative Services)	Miranda Fong	MP368	6693
Terminal Rentals	tba	SF4306	3787
U of T Computer Library	Stephanie Johnston	EA206	2987

UTCS Directory

Director	Dr. Warren Jackson	MP350	8948
Associate Director	Eugene Siciunas	MP350	5058
Managers:			
Communications & Technical Support	Norman Housley	SF4306	4967
Internal Systems & Administration	Ron Vander Kraats	MP350	4428
Operations	Dr. Bob Chambers	MP350	7092
Systems	Bill Lauriston	MP331	3579
User Interface	Don Gibson	MP350	7331

Committees on Computing

UTCS Board	Chairman	Prof. D.M. Nowlan	4984
Natural Language Processing Steering Committee	Chairman	Prof. I. Lancashire	828-5273
UTCS Users' Committee	Chairman	Prof. J.T. Stevenson	6930
	Secretary	Ms J. Barteski	8204

ER = Erindale
SC = Scarborough
MP = McLennan Physical Labs
SF = Sandford Fleming

UTCS Terminal and Advising Sites

Names and Locations

- **Central Advising Office (CAO), 978-HELP**
- **Education Facility (Educ),** McLennan Labs, 255 Huron St., Room 221
- **Engineering Annex (EA, CDF),**11 King's College Road, Rooms 103, 104, 107, 107B, 201, 203.
- **Erindale College (Erin), 828-5339,** Mississauga Road, Erindale Campus, Rooms 2005, 2039, 2045
- **Robarts,** Robarts Library, 130 St. George St., Room 1061A
- **Scarborough College (Scar), 284-3122,** Military Trail, Scarborough Campus, Rooms S624, S625, S627, S628, S628A
- **Sidney Smith (Sidney),** 100 St. George St., Rooms 1071, 1073, 2105
- **St.Michael's College,** 121 St. Joseph St., Room 107
- **Trinity College,** 6 Hoskins Ave., Room 024
- **Victoria University,** 73 Queens Park Cres., Room 005.

Sites	**Hours of Access**				**Restrictions***	**Advising**
	Mon-Thurs	**Fri**	**Sat**	**Sun**		
CAO	10:00-18:00	10:00-18:00	closed	closed	Research	978-HELP
CDF	24 hrs	24 hrs	24 hrs	24 hrs	Undergrads	No
EA	24 hrs	24 hrs	24 hrs	24 hrs	None	978-HELP for Research
Educ	24 hrs†	24 hrs†	24 hrs†	24 hrs†	Research**	978-HELP
(outer)	24 hrs†	24 hrs†	24 hrs†	24 hrs†	Research	978-HELP
Erin (2039)□	9:00-17:00	9:00-17:00	12:00-16:00	12:00-16:00	Research	Rm 2005
(2045)	24 hrs	24 hrs	24 hrs	24 hrs	Undergrads	Rm 2005
Robarts	8:30-24:00	8:30-24:00	9:00-17:00	13:00-22:00	None	978-HELP for Research
Scar	9:00-24:00	9:00-24:00	10:00-17:00	closed	Research	Rm S626
					Undergrads	Rm S626-A
Sidney	7:00-24:00	7:00-24:00	7:00-24:00	7:00-24:00	None	978-HELP for Research
St.Michael's	24 hrs	24 hrs	24 hrs	24 hrs	None	Arranged by College
Trinity	8:00-22:00	8:00-22:00	8:00-22:00	8:00-22:00	None	Arranged by College
Victoria	8:30-23:00	8:30-23:00	closed	closed	None	Arranged by College

* Research includes graduates, faculty, staff. ** May be unavailable due to UTCS courses. □ key access available.
† Building open Mon.-Thurs. 7:00 - 22:00, Fri. 7:00 - 17:00. Building closed Sat. & Sun.

Advising Hours

CAO	Monday through Friday, 10:00 - 18:00
Scar	Monday through Friday, 09:00 - 17:00
Erin	Mon. 09:00-17:00, Tues.-Thurs. 09:00-20:00, Fri. 09:00-17:00

Sites	**PACX**	**Network Terminal Server**	**Printers**	**Keypunch**	**DCS/Micros**
CDF	Y	N	Y	N	N
EA	N	Y	Y	Y	N
Educ	Y	N	N	N	N
Erin	Y	Y	Y	N	N
Robarts	Y	N	Y	N	Y
Scar	Y	Y	Y	N	N
Sidney	N	Y	Y	N	Y
St.Michael's	Y	N	Y	N	Y
Trinity	N	N	Y	N	Y
Victoria	Y	N	Y	N	Y

(Y=yes, N=no)

UTCS Services

The principle mandate of UTCS is to plan, inplement, and operate computer facilities and "common-carrier" networks, and to plan and support divisional, departmental or project computer facilities as requested.

UTCS Centrally Owned and Managed

Systems

IBM MVS

- TSO, WYLBUR,APL, Batch
- 4381-R03 processor, 32 megabytes of memory
- MVS operating system

IBM VM/CMS

- General Purpose Timesharing; access to NetNorth, BITNET, and EARN networks
- 4381-P02 processor, 16 megabytes of memory
- CP operating system, VM/SP Release 3
  CMS timesharing system, VM/SP Release 3
  RSCS spooling system, Release 3

GP UNIX

- General Purpose Timesharing using UNIX
- VAX-11/750, 5 megabytes of memory
- typesetting hardware (CAT/8)
- offers USENET "news" and electronic mail to most uucp sites

Services

Communications & Technical Support
Primary Phones: 978-3787, 978-4967

- Communications Group provides communications systems, terminals, modems, data channels: consulting and installation.
- Field Service Group installs and maintains communications and computer systems on a contract basis or on a cost-per-call basis.
- provides consulting on computer systems technology and installs computer systems
- provides access between the IBM systems and machines using UNIX, VMS and other operating systems. Ethernet and Pronet technologies are used over various transmission media including optical fibre. More basic communications techniques are also used for moderate speed links.
- provides access to NetNorth (BITNET), the North American Universities Network; and USENET, the UNIX networking fraternity
- will provide a communications solution to department needs on a contractual basis.

User Interface Group
Primary Phone: 978-HELP

- provides advising, consulting and documentation on:
  - command languages including CMS, TSO, WYLBUR, JCL and UNIX
  - high level languages including FORTRAN, APL and PL/I
  - packages and libraries including SAS, SPSS-X, BMDP, IMSL and NAg
  - editors and formatters including XEDIT, TSO, WYLBUR, ed, SCRIBE, nroff/troff
- installs and maintains application packages
- provides courses on the more popular services
- provides general micro support
  - selection consulting for hardware and software
  - Micro Lab for evaluation of hardware and software
  - advice on University discounts
  - media conversion and data transfer
  - operates UTCS Microcomputer Bulletin Board System

Facilities Managed by UTCS

Administrative Computing

- administrative IMS/VS, DB/DC, DB2, Batch and TSO
- 4381-R03 processor, 32 megabytes of memory
- MVS operating system

UNIX SAS (Statistical Analysis Services)

- UNIX Statistical Analysis Service (Dept. of Statistics only)
- PDP-11/70, 4 megabytes of memory
- UNIX Seventh Edition

Computer Disciplines Facility/VAX

VAX-11/780, 4 megabytes of memory
VAX-11/750, 4 megabytes of memory
VAX-11/750, 3 megabytes of memory

- Computer Science interactive access
- UNIX (Berkeley UNIX 4.2BSD)

Computer Disciplines Facility/PC

- 97 TI Professional Computers connected in a Local Area Network
- introductory Computer Science instruction
- MS-DOS with Turing environment

Scarborough College Systems

VAX-11/750, 5 megabytes of memory
VAX-11/750, 5 megabytes of memory

- instructional access using UNIX (Berkeley UNIX 4.2BSD)

Erindale College Systems

VAX -11/780, 4 megabytes of memory

- instructional access using VMS
- research access

VAX-11/750, 5 megabytes of memory

- instructional access using UNIX (Berkeley UNIX 4.2BSD)

Private Funding - Alumni Affairs

VAX-11/750, 6 megabytes of memory

- database services to the owner departments using VMS

EPAS Facility

- 4361-5 processor, 12 megabytes of memory
- general VM/CMS services to the owner departments

UTCS COMPUTERNEWS Subscription Request Form

If you wish to have your name and/or address added, changed or deleted from our *COMPUTERNEWS* mailing list, please complete this form.

Please ☐ add

☐ change

☐ delete my name and address.

NAME, ADDRESS and TELEPHONE, in full	PREVIOUS NAME and ADDRESS, in full (or include your old mailing label)
--	--
--	--
--	--
--	--
--	--

Check here if you can receive *COMPUTERNEWS* by campus mail. ☐

Comments on this issue of *COMPUTERNEWS.*

-----------------------------**FOLD HERE**-----------------------------

Return to:

COMPUTERNEWS
University of Toronto Computing Services
McLennan Physical Laboratories
Room 350
Toronto, Ontario
M5S 1A1

UNIVERSITY OF TORONTO
COMPUTING SERVICES
TORONTO, CANADA
M5S 1A1